The impact of oil prices on the dollar value

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Team Members

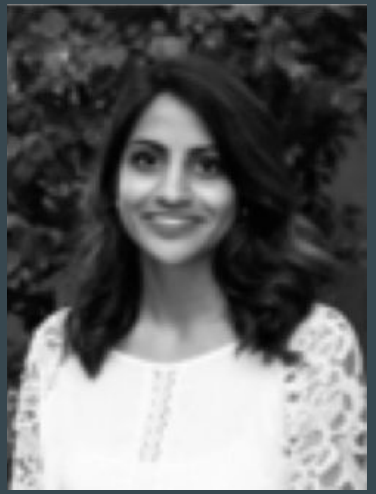
Rita

Rita works at Frontier Communications as a Network Planner. At her director's prompting, she chose the Berkeley Bootcamp Data Analytics program to gain relevant analysis skills.

Juan

Juan works at Kings Hawaiian as Business Solution Analyst in the Data & Technology Services department. He is very excited to learn about ML and to be able to use it at his work, which will enable ML Analysis.

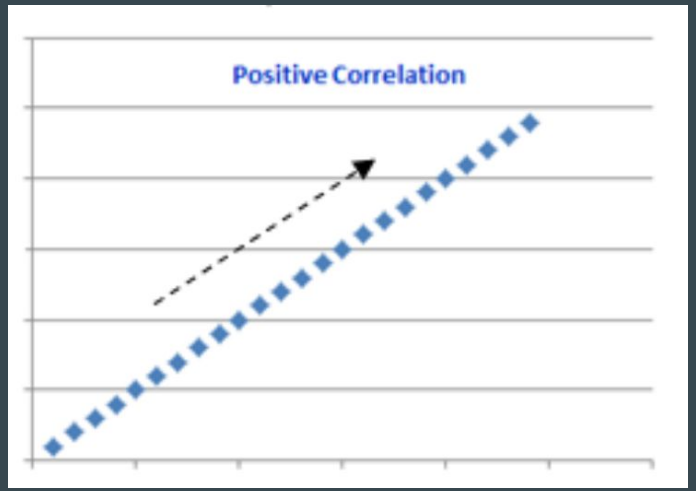
Sheela



Sheela graduated from UC Berkeley in 2017 with a degree in Human Biology. Currently is a project manager at AstraZeneca. She is passionate about using data to support business development and growth needs of healthcare systems and biopharmaceuticals.

Claim

- The goal of this project is to prove that there is a correlation between oil prices and the value of the dollar. Our hypothesis is that there will be a strong positive correlation between the oil prices data set and the dollar value data set.



https://www.whatissixsigma.net/wp-content/uploads/2013/12/Correlation-V1.0-Figure-A-and-B.png

Project Background

- This project will establish a correlation between oil prices and the value of the dollar.

- This project has real world applications because oil prices will impact transportation, manufacturing and production of goods. Oil prices will also strongly impact the way people travel and will allow for greater discretionary income. More recently, the effects on COVID-19 have cause oil prices to drastically drop and we would like it explore its effects on the dollar value.

Data Implications

We have 1 main questions we hope to answer throughout the project

1. Is there a strong, positive correlation between oil prices and the dollar value?

Data Sources

1. US Dollar Index 43 years
Source: www.macrotrends.net
580 Records / 1973 to 2019

2. WTI Crude Oil Prices - 10 Year Daily Chart
Source: www.macrotrends.net
2,535 records / 2010-2020

3. Energy Information Administration
Source: http://www.eia.gov/oil_gas/petroleum/data_publications/wrgp/mogas_history.html
1,326 Records / 1994-2020

4. Global Crisis Source: Harvard Business School
Source: https://www.hbs.edu/behavioral-finance-and-financial-stability/data/banking-system/Pages/default.aspx
15,000 Records / 1800-2020

5. Standard and Poor's (S&P) 500 Index Data
Source: https://datahub.io/collections/stock-market-data
1,700 Records / 1871-2018

Description of Data Sources

1. “US Dollar Index 43 years” data provides data on fluctuating dollar value trends throughout decades. Using this data it is possible to see how major global events have impacted the value of the dollar

2. “WTI Crude Oil Prices - 10 Year Daily Chart” data set provides information on fluctuating oil prices throughout the past decade. Using this data it is possible to see how major global events have impacted the value of oil

3. “Energy Information Administration” data provides prices for gasoline in the USA for past 10 years. This will be backup data to oil prices.

4. “Global Crisis Source: Harvard Business School” data provides information on historical events that have strongly impacted banks in the world. We will use this data to understand how major events have affected oil prices and the dollar value

Data Exploration

- We have chosen these specific data sets because they will help us identify if there a correlation between fluctuations in oil and gas prices

- The data sets provide a monthly overview of the relationship between oil and gas prices

- The technologies used during the data exploration segment are Jupytor Notebook and pgAdmin4 and the language used is Python

Machine Learning Model

- For our topic we have chosen to utilize linear regression model to predict the correlation between oil prices and the value of the US dollar. We will then use the same algorithms to analyze how world events will impact oil prices and the strength of the dollar

- When we combine the algorithms, the final result will predict the oil price and present an image to show the correlation and the accuracy of the models.

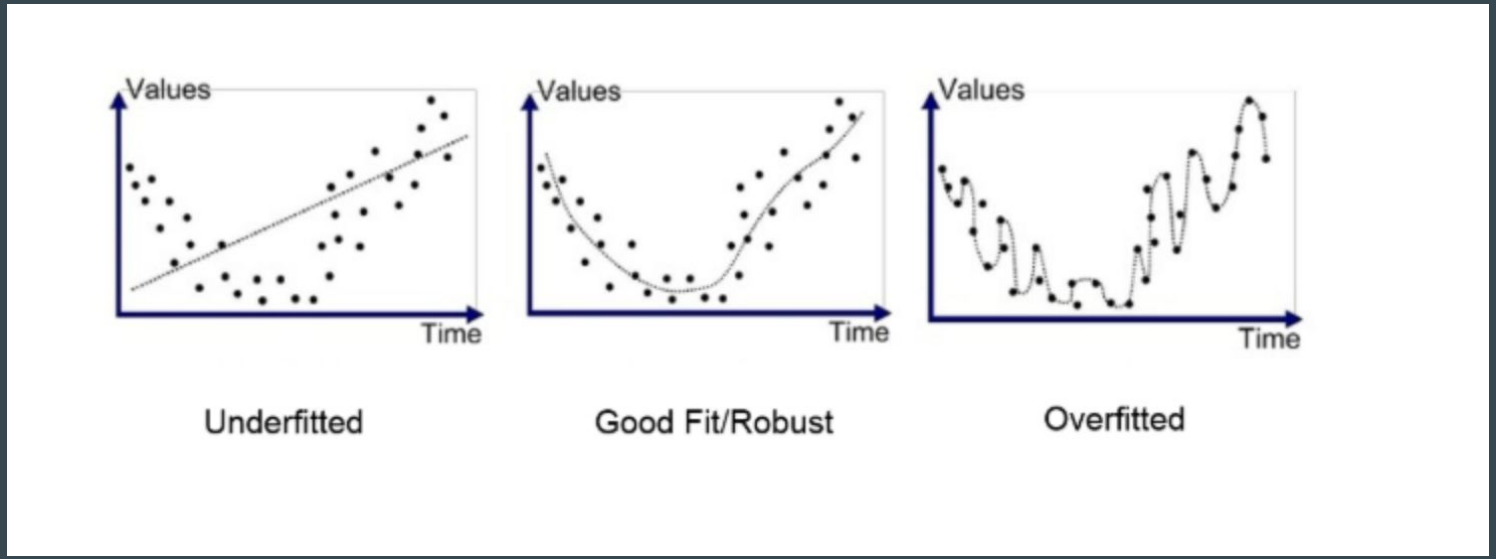
Understanding The Machine Learning Model

- Prior to delving into linear regression, it is first important to understand the term regression

- Regression is a modelling method used to identify a target value based on independent predictors

- Linear regression is a type of regression analysis where there is a linear relationship between the independent and dependent variable
    - The independent variable lies on the x axis
    - The dependent variable lies on the y axis

Linear Regression



Benefits of this Model for Oil Data Analysis

- Linear regression is a supervised machine learning model

- The model is beneficial to use because it assumes nothing about the data and heuristics are not used. This simplifies the process of establishing a correlation between datasets and is also fast to execute. Both of these qualities are desirable for very large and complex datasets such as the ones we are using for this project.

Accuracy of Linear Regression

- The linear regression line is an accurate model because it establishes a correlation between two values that have dependencies on each other

- It is also an accurate predictor of future trends, in this project we will be able to use the established correlation between oil prices and gas prices to determine how fluctuations in the price of oil will affect future changes in gas price

Importance of Statistical Data for Oil and Dollar Value Correlation

- The linear regression line is important to establish the correlation between oil prices and the dollar value. They will negate any bias within the data and increase the probability of obtaining values that will provide the most accurate best fit line.

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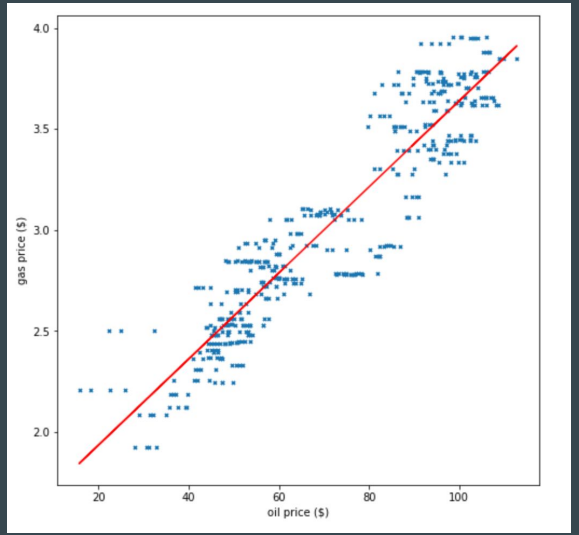
Description of Analysis Phase of Project

- The results show us that there is a strong positive correlation between the oil prices and gas prices
  - This means that as gas prices increase, oil prices also increase
- We explored the best fit line while changing the number of data points in the model and the line showed no difference in the slope



Further Exploration

- For future work, we would like to examine the effect external factors will have on the correlation between oil and gas prices
  - External factors include
    - Pandemic
    - Election
    - A natural disaster

Resources

- https://www.investopedia.com/articles/investing/032515/how-oil-prices-impact-us-economy.asp
- https://towardsdatascience.com/introduction-to-machine-learning-algorithms-linear-regression-14c4e325882a